California Energy Commission Vehicle-Grid Integration Roadmap Stakeholder Workshop

Example Completion of Discussion Item 4: Current Activities

- **Please list current research, development or deployment efforts directly related to vehicle-grid integration (e.g., managed or smart charging) using the table below.** Provide a description of the activity and identify whether the activity is a research, development, or deployment initiative; whether the project is current, past or planned; what the project goals are; who the relevant stakeholders are; and what the project milestones and timeline is, was or will be.

The following provides an example of a preferred response submittal for discussion item 4: Current Activities.

This example is based on published filings and material obtained from prior workshops.

If you have suggested edits and additions to the material below, such as updated schedules or listings for stakeholders conducting the activities, or additional detail on milestones or project goals, please provide them in addition to any response that lists other research, development, or deployment efforts directly related to vehicle-grid integration.

Category	Activity Type *Research, Development or Deployment? Past, current or planned?*	Activity Description *Describe activity*	Activity Goals *Describe activity goals*	Relevant Stakeholders *Describe relevant stakeholders involved in the activity*	Activity Milestones & Dates *Identify known activity timeline and milestones*
Consumer Awareness	SCE pilot *Confirmation of whether this activity is active, planned or completed is requested.*	SCE intends to deploy up to 233 PEV charging stations at SCE facility parking lots, which includes 50 that were previously installed under earlier funding. User load will be measured at each charging station, and a user fee will be paid by the individual consumer using a vendor supplied billing & settlement service. Utility load survey metering is already installed on most charger circuits for monitoring load impacts and will be expanded to all new charger circuits. This metering will be sufficient to measure ongoing load profiles for aggregate charging on each circuit and the effectiveness of various DR pilot program strategies. Communication from individual charge stations to the vendor back office for billing & settlement will be required & will serve as the most granular measurement of DR effectiveness. Load management, price signaling, and DR load reductions will be controlled by Open ADR 2.0 messaging via either the charge station supplier's back office network or alternatively through a system integrator network.	The objectives of this pilot are to: • examine the effects of workplace charging on supply systems, and • determine how to minimize the impact of workplace PEV charging on the electrical grid without adversely affecting PEV owners, suppliers, and the utility during working hours. It will determine the impacts of PEV charging on building load shapes in numerous facilities of varying sizes, workforce populations and demand profiles.	CPUC, SCE, customers	2012-2014 *Updated schedules or details on milestones are requested.*

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Industry Awareness	PG&E and AEP Study *Confirmation of whether this activity is active, planned or completed is requested.*	PG&E is working with American Electric Power (AEP) to study using batteries directly alongside distribution transformers.	Determine viability of distributed energy storage for voltage regulation and capacity augmentation, as well as for use in enhancing transmission circuits in order to forestall costly upgrades.	PG&E, AEP	*A timeline and details on milestones are requested.*
Economics	SDG&E EV TOU rate pilots *Confirmation of whether this activity is active, planned or completed is requested.*	SDG&E customers with EVs were randomly assigned to 1 of 3 experimental TOU rates specifically for their EV charging. Their charging behavior was analyzed.	The goals of the SDG&E's rate experiment are to understand the potential impact of EV technology on the electric utility infrastructure and identify methods to mitigate grid impacts	SDG&E, CPUC, customers	2011-2013 *Updated schedules or details on milestones are requested.*

Category	Activity Type	Activity Description	Activity Goals	Relevant Stakeholders	Activity Milestones & Dates
Wholesale Market	DOD VG pilot projects EVSE services based pilots EV charging station based pilots *At the time of this workshop, these efforts are active*	Aggregated EV wholesale participation in the ISO market for Energy and Ancillary Services capable of bi-directional power flow. Aggregated EV wholesale participation in the ISO market as a demand side load resource.	The goals of this project are for the ISO to develop an understanding of how EVs could participate in the ISO wholesale energy market and assist in the efforts of integrating additional amounts of variable and intermittent renewable resources while maintaining grid reliability. Specifically, the goals are to: • Determine grid integration requirements to enable EV participation in the wholesale energy market • Develop an aggregated vehicle resource configuration between the EV & the ISO which meets ISO requirements for providing regulation services interconnection, telemetry, metering • Demonstrate VGI capability from an aggregated fleet of EVs providing regulation services under the NGR LESR/REM and PDR Models • Document gaps or potential changes to ISO market products or operational systems which may be required to enable EV integration	DOD; EVSE Services Suppliers; EV Charging Station Developers; EVSE OEMs; CPUC; CEC; SCE, SDG&E, PG&E	Milestones are subject to pilot or demonstration scope. Pilot efforts began in 2011 ISO Market Simulation exercises began in 2012/13 Market participation is expected to begin late 2013 into 2014 as each pilot reaches the ability to participate See CPUC Resolution E-4595

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Wholesale Market	Los Angeles Air Force Base Vehicle-to-Grid Demonstration *This activity is active*	The effort will be focused on the integration of electric vehicles with vehicle-to-grid capability. Some of the project funding is going to the lease/purchase of 13 Nissan LEAFs that will be made V2G-ready so they can be used to bid into the California ISO ancillary services market in addition to performing the normal daily vehicle activities.	The goal of this project is to accelerate the adoption of V2G-capable electric vehicles, demonstrate their use as a base level grid management system and advance their revenue-generating capability through grid ancillary services consistent with AB 118 program objectives. Additional V2G demonstrations at other Department of Defense bases are active or pending.	CEC, LADWP, CAISO, CPUC	2012-2016 See CPUC Resolution E-4595 LA Base construction is to the point of installing EVSE EVs and EVSE testing to begin in October 2013 Interconnection agreements in progress with a goal for market participation in late 2013

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Policy	California Clean Fuels Outlet Regulation *Confirmation of whether this activity is active, planned or completed is requested.*	Add a regulatory review for plug-in EVs. Electricity is currently excluded from the definition of a designated clean fuel in the regulation. Staff is proposing to add regulatory language that requires ARB to evaluate the development and usage of workplace and public charging infrastructure, and make recommendations for further actions two years following adoption of the regulation.	The Clean Fuels Outlet (CFO) Regulation is intended to provide outlets of clean fuel to meet the needs of those driving clean, alternative fuel vehicles.	ARB	Public hearing on 9/26/2013 to consider CFO amendments; Add PEV language to regulation for workplace & public charging infrastructure within 2 years of adoption. *Updated schedules or additional details on milestones are requested.*

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Policy	ZEV Executive Order and Action Plan	• Provide crucial early funding for ZEV charging and fueling infrastructure • Support ZEV infrastructure planning and investment by public and private entities • Enable universal access to ZEV infrastructure for California drivers • Ensure pricing transparency for ZEV charging and fueling • Plan for and integrate peak vehicle demand for electricity into the state's energy grid • Establish consistent statewide codes and standards for ZEV infrastructure • Coordinate with other "Section 177 states" that have adopted California's ZEV mandate to learn from each other's innovations and enable a seamless consumer experience for ZEV drivers across the country	The Executive Order established several milestones on a path toward 1.5 million ZEVs in California by the year 2025. This 2013 ZEV Action Plan identifies specific strategies and actions that state agencies will take to meet milestones of the executive order.	Governor's office, Caltrans, CARS, CPUC, CEC, CDFA, CAISO, HCD	**2015**- The state's major metro areas will be able to accommodate ZEVs through infrastructure plan and streamlined permitting **2020**- ZEV infrastructure able to support up to 1 million vehicles **2025**- Over 1.5 million ZEVs on CA roadways and their market share will be expanding

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Technology	EV Infrastructure Deployment & Planning Grants *Confirmation of whether this activity is active, planned or completed is requested.*	Res installed: 2,039 Res Planned: 165 Workplace installed: 1,653 Workplace planned: 1,457 Fast Charging installed: 1 Fast Charging planned: 37	The Energy Commission has allocated $15.3 million with matching federal stimulus funds of $55.8 million to install more than 4,000 additional charge points statewide.	CEC, regional planning agencies, PEV charging infrastructure provider	2010-2013 *Updated schedules or additional details on milestones are requested.*

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Technology	PG&E PEV Pilot *Confirmation of whether this activity is active, planned or completed is requested.*	The pilot will concentrate on determining: • Requirements Needed To Obtain Utility Benefits: Determine the requirements needed for PG&E to incorporate DR from PEVs into its operational & planning groups and the associated benefits that would accrue to DR PEV providers. • Communication Capabilities: Evaluate the technical capability to provide timely 2-way communication, such as price & Direct Load Control messages, to the EVSE and PEVs over the AMI network and/or broadband network using national standards • DR Response Characteristics: Evaluate how quickly and in what manner EVSEs and PEVs respond to signals to alter charging patterns based on the PEV battery's state of charge and user profiles, both on an individual basis and in aggregate. • Customer Response: Evaluate customers' charging patterns, preferences, behavior, and reactions to utility interaction with PEV charging. • Second Life Customer: Evaluate and engage various automaker OEM and EV vendor channels to explore what the best mechanism is to encourage demand response adoption by EV customers is. • Second Life Battery Integration: Evaluate the costs & benefits of utilizing second life EV batteries to provide various grid services.	*Details on activities and goals are requested.*	PG&E, CPUC, customers	2012-2014 *Updated schedules or additional details on milestones are requested.*

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Technology	EU RD&D Gap Study Completed.	Conduct a study to collect the information on all on-going or recently concluded research, development and demonstration projects on electric and plug-in hybrid electric vehicles, which received EU or national public funding with a budget >1mln Euro, Studies relevant to VGI included those that evaluated vehicle control capabilities and needs, and power grid communication, along with battery life effects of usage.	Assess which of the electric drive vehicles challenges are addressed by the projects reviewed and identify potential gaps in the research, development, and demonstration landscape in Europe. More than 320 R, D & D projects funded by the EU and Member states are listed and analyzed. Their total budgets add up to approximately 1.9 billion Euros.	Government agencies across EU; Car companies; Universities	2013 No publicly reported milestones for the study.
Other	NRG Energy Settlement. *Confirmation of whether this activity is active, planned or completed is requested.*	NRG will pay to install a minimum of 200 fast charging "Freedom Stations"—110 in the Los Angeles Basin; 55 in the San Francisco Bay Area; 15 in the San Joaquin Valley; and 20 in San Diego County—that will be available for use by anyone with an electric vehicle for a minimum five year period. NRG will install 20% of these stations in low income areas.	(FERC) has approved a settlement agreement that will bring more than $100 million in electric vehicle charging infrastructure to California, including at least 200 public fast-charging stations and the infrastructure for 10,000 plug-in units at 1,000 diverse locations across the state.	NRG	First stations will be available in early 2013. *Updated schedules or additional details on milestones are requested.*